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A COST FINDING ANALYSIS OF UNCOMPLICATED OBSTETRICS SERVICES AT NAVAL HOSPITAL CAMP LEJEUNE, NC

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ABSTRACT

Naval Hospital Camp Lejeune (NHCL), like other health care facilities throughout the world, must find ways to reduce the costs of providing health care, improve the quality of care, and increase access to its beneficiaries. If cost, quality and access are not improved the facility will ultimately be replaced by a more efficient and effective means of providing health care to its beneficiaries.

Historically, the local community hospital, Onslow Memorial Hospital (OMH), offered substantial discounts to patients eligible for the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). These discounts have since diminished and costs have subsequently increased. To combat the ever increasing costs associated with health care, NHCL has begun to analyze costs and find ways to increase efficiency and effectiveness.

In 1996, NHCL's Obstetrics costs accounted for nearly 25% of their total CHAMPUS bill. This prompted a cost study to determine NHCL's cost of providing OB care as compared to the costs of providing equivalent care to beneficiaries through the CHAMPUS system. This study revealed that OB costs at NHCL were considerably less than those incurred via CHAMPUS. Therefore, further investigation into increasing OB volume at NHCL is warranted.

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INTRODUCTION

Naval Hospital Camp Lejeune (NHCL), like other health care facilities throughout the world, must find ways to reduce the costs of providing health care, improve the quality of care, and increase access to its beneficiaries. If cost, quality and access are not improved the facility will ultimately be replaced by a more efficient and effective means of providing health care to its beneficiaries. These are some of the reasons NHCL strives to improve the care it provides, and the processes through which it is provided.

Naval Hospital Camp Lejeune is part of Marine Corps Base, Camp Lejeune, located in eastern North Carolina, near the New River Inlet. The current facility was built in 1983, and is composed of a four-story nursing tower with a two-story anterior building supporting clinical, ancillary, and administrative functions. NHCL has a capacity of 205 beds expandable to 236 beds. The primary function of NHCL is to support active duty forces. Next, care for active duty dependents, retirees and their dependents, and other beneficiaries is provided, on a space available basis. Of the 93,000 beneficiaries in the Camp Lejeune catchment area approximately 50,000 are dependents (Naval Hospital Camp Lejeune, Public Affairs Office, 1995).

Background

On 27 January 1996, the local community hospital, Onslow Memorial Hospital (OMH), announced their decision to discontinue a 20% discount on specific inpatient and outpatient obstetric (OB) care offered to patients who were eligible for the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). For the next six months no discount was offered; but in June of 1996, OMH agreed to offer a 10% discount on specific outpatient care. The reason for reducing the 20% discount was based on the fact that OMH had recently compared their amount billed for services with the amount they were actually receiving from CHAMPUS. The actual payment, after considering the CHAMPUS maximum allowable charge (CMAC) and subtracting the discount, was less than 40% of the billed amount. Prior to this realization, no attempt had been made to compare the normal billing price for care with the amount collected from CHAMPUS (personal interview with Pete DeMonch and Delores Hillyer, 30 January 1997).

In May of 1996, OMH was awarded the status of "Sole Community Hospital." This status was sought out after OHM realized that two similar, local community hospitals had received this designation. Now that OMH is DRG exempt, they can expect to receive payment based more closely to their costs than a prospective rate (personal interview with Pete DeMonch and Delores Hillyer, 30 January 1997). These changes would have a major impact on military medicine's budget and all CHAMPUS eligible beneficiaries associated with OB.

In 1993, NHCL faced a similar situation when OMH threatened to discontinue the 20% discount they were offering. NHCL launched an investigation into the financial ramifications of this change. The investigation was led by CDR N. Cordell, then Head of NHCL's managed care office which is called Eastern Carolina Coordinated Care (EC3).

Several possible alternatives were considered. The first option was to continue doing business with OMH at a 20% cost hike. This was clearly not a desirable option considering the financial status of military medicine. Next, since OMH is the only hospital in the immediate area, dealing with another facility was also not a reasonable possibility. The third alternative was to recapture the OB care at NHCL (Cordell 1993).

The purpose of the 1993 OB investigation was to determine the possibility of recapturing the OB care being disengaged to CHAMPUS. In 1993, NHCL delivered approximately 100 babies each month and disengaged about 125 OB patients per month. All patients disengaged for OB received their care through local civilian physicians and delivered at OMH or another civilian institution. The discount for OB care included all outpatient OB visits, delivery, and care of the newborn until discharge. High risk OB patients were sent to New Hanover Medical Center in Wilmington or Pitt Memorial Hospital in Greenville, approximately 60 to 70 miles away. This practice continues today. High risk cases account for about 5% of all OB cases at NHCL (Cordell 1993).

Findings from the 1993, EC3 investigation indicated that Labor and Delivery (L&D) could handle up to 1,800 deliveries annually or 150 per month, with few modifications. Alterations to the patient flow and augmentation of the staff are examples of the recommended modifications. It further stated that other departments would need additional staffing and/or minor remodeling to support the goal of 150 deliveries per month.

The 1993, OB investigation focused on recapturing the delivery portion of the OB process. It was decided that the outpatient clinic at NHCL would not be able to support the prenatal visits associated with 150 monthly deliveries. OB care would be provided by local civilian physicians, via CHAMPUS, up to the point of delivery. Then, civilian physicians from the local area would deliver the baby in the MTF or an MTF provider would handle the delivery. Either alternative leads to confusion and logistical difficulty.

This recapture plan became moot when, at the eleventh hour, OMH abruptly announced the continuation of the 20% discount for OB care. This sudden turn around is believed to be related to the OMH realizing the significance of losing a substantial portion of their OB patient base just months before the opening of their state-of-the-art birthing unit (personal interview with Pete DeMonch and Delores Hillyer, 30 January 1997).

Current Issue

In 1996, OMH announced its decision to discontinue the 20% discount for OB care. In 1993, OB was the single largest CHAMPUS cost in the Camp Lejeune catchment area, accounting for approximately 24% of all CHAMPUS costs (Cordell 1993). According to the Managed Care Query Access System (MCQA), in fiscal year (FY) 1996, OB care accounted for 25% of all CHAMPUS costs and recapturing this care could lead to a significant cost savings.

In FY95, NHCL delivered 1,194 babies or roughly 100 per month. During the same period, there were 25,787 total outpatient OB related visits. In FY96 there were 1,173 deliveries and a total of 26,784 outpatient OB related visits.

Capitation is making MTF commanders think more competitively and in terms of business and survival. The impending Tricare contract coupled with a capitated budget force MTF commanders to think about reducing costs and making better business decisions. For Region 2, Tricare is scheduled to begin sometime during the next calendar year.

PURPOSE

The purpose of this study is to determine NHCL's cost of providing OB care as compared to the costs of providing equivalent care to its beneficiaries through the CHAMPUS system. In order to determine if it would be prudent to recapture OB care, a cost finding analysis is necessary. This study will find and compare the costs of furnishing OB services to eligible beneficiaries. The

Commanding Officer of NHCL prompted this study to assist Navy Medicine in reducing costs of providing healthcare to its beneficiaries.

REVIEW OF THE LITERATURE

In determining the costs relevant to OB care, it is important to complete a thorough study of the details. To achieve this goal a literature review is a necessary first step.

Cost Object

This review will begin by defining a "cost object." The *cost object* or *cost objective* is defined by Anthony (1993) as any product, process, or organizational unit for which costs are aggregated. A cost object can be an actual part of the organization, such as a clinic or ward. It could also be something the organization produces such as an outpatient visit or a normal vaginal delivery.

By identifying the cost object, managers can attempt to determine the cost of doing business. Tracing costs often leads the investigator to groupings of costs, or cost pools, which must be inspected and broken down to expose only those costs related to the cost object (Finkler 1994). Clearly defining the cost object is of the utmost importance.

Cost Accounting

Cost accounting is nothing more than the process of identifying and collecting the costs of resources and assigning them to the products or services they support (Anthony 1993 and Finkler 1994). Before one can begin an investigation involving the costs of goods or services, a basic understanding of cost accounting is necessary.

Cost accounting includes a broad array of financial information useful to managers. Included in this information are the products of managerial accounting as well as a portion of financial accounting. Its primary purpose is to assist managers in planning and controlling organizational operations. Planning gives the organization an opportunity to maximize their potential, while the control process ensures the organization takes the opportunity to achieve this potential (Finkler 1994).

More and more hospitals are realizing the importance of cost accounting systems. Unfortunately, a large number of hospitals are not using an efficient cost accounting system (Nemes 1991). These systems are very expensive and may be difficult to justify in light of budget constraints. But how can a facility survive without knowing which product lines are solvent and which are depleting the already scarce resources without yielding any measurable benefit? The answer is that they will be forced to adopt an effective cost accounting system or they will be unable to keep up with the more proficient organizations, leading to their demise.

Full, Direct, and Indirect Costs

"Full cost" refers to all costs associated with a specified cost object. They are made up of direct and indirect costs associated with the goods or services (Pelfrey 1995 and Goldschmidt and Gafni 1990).

Full cost also include substantial fixed costs which are often allocated in an arbitrary fashion. This practice may have been useful in setting prices or determining costs when prices could be expected to be paid in full, but today's scenario is much different. Full costs are not helpful in resolving make versus buy or competitive bid decisions in the short term (Holmes and Schroeder 1996). They may include too many extraneous costs irrelevant to the decision.

Direct costs are those costs that can be traced directly to the service provided. Finkler (1994) defines direct costs as costs that are clearly and directly associated with the cost objective. They are also generally under the control of the manager who has the responsibility for the overall cost objective. Examples of costs that are typically categorized as direct include expendable supplies used in a clinic, a service contract for a specialized piece of equipment, or the salaries of personnel producing the cost objects involved in that department.

Indirect costs are not as easy to allocate and consist of all costs that are not classified as direct costs (Finkler 1994). These costs are often referred to as overhead costs. Examples of indirect costs include the water and electricity used

by the organization, the salaries of some management personnel, and the costs of cleaning and handling laundry.

Often, indirect costs could be traced to each cost center but the expense incurred may not justify the effort. The administrative costs of managing this task would be too labor intensive and may require additional resources. The result is that organizations find other means of estimating indirect costs. These alternate means are typically less costly and less accurate (Pelfrey 1995).

Fixed and Variable Costs

Costs can also be broken down by the way they are affected by volume. Fixed costs can be defined as those costs that do not vary as volume is increased or decreased (Finkler 1994, Cleverly 1987, Anthony 1993, and Turney 1991). Fixed costs are based on a relevant range of volume, however, so they may change with significant changes in volume (Anthony 1993). For instance, within a given range, salary expenses would not change as the number of patients increase or decrease.

Another classification of costs based on volume is termed "variable" (Holmes 1996 and Finkler 1994). Variable costs vary in direct proportion to volume. For example, if supplies for one patient costs $90, then supplies for four patients will cost $360.

A third classification of costs is step-fixed. This classification is sometimes referred to as step-variable or semi-fixed (Finkler 1994). Finkler (1994) defines step-fixed costs as those that are fixed over a certain range of volume, but as the

range is exceeded, fixed costs become variable within the new range. The number of nurses on a ward is an example of a step-fixed cost. For example, at a given acuity level, the standard of care may allow each nurse to care for 5 patients. If the ward has 10 patients, 2 nurses are required. If one more patient is admitted to that ward an additional nurse must be brought in to meet the standard of care. Once 3 nurses are on board, the ward will be able to add up to 4 additional patients before a fourth nurse is needed.

Marginal Costs

Marginal costs are the change in costs related to the change in activity (Finkler 1994). In other words, what would it cost to see one more patient? These costs include variable costs as well as fixed costs that change as the volume exceeds the relevant range. Marginal costs are valuable when decisions are being made over a relatively short period of time. They are also referred to as incremental costs or out-of-pocket costs.

Relevant Costs

Relevant costs, as defined by Finkler (1994), are those costs subject to change as the result of a decision. The decision may hold for 1-2 years (short term), or it may stand for several years (mid to long term). In any case, relevancy is influenced by time.

All costs are either relevant or irrelevant to the study at hand (Garrison 1991). It is important to understand that in one decision making study a cost may be relevant, while the same cost may be irrelevant to another study. For example, MTF facility costs are considered irrelevant to this study because these costs will not change based on this study. On the other hand, if this were a civilian operation, rent on the space associated with OB services may change based on the decision resulting from this study.

The difficulty is determining which are relevant and which are not. Accidental inclusion of irrelevant costs may cause the investigator to arrive at incorrect conclusions, skewing decision making.

According to Holmes (1996), there are three key features that will help to expose the costs which are relevant. The first is a clear definition of the cost object, which was discussed earlier. The second feature is identification of the alternatives available. The third is to determine the time frame the decision will hold.

To determine relevant costs alternatives must be identified. The question, "How much does it cost to provide prenatal care and delivery to a patient?" is vague and difficult to answer. The individual answering the question must read too much into the question in an attempt to answer the research question. A more thorough question might be, "How much does it cost to provide prenatal care and delivery at NHCL compared to the costs of disengaging the patient to civilian care via the CHAMPUS system?" This question gives the investigator the necessary

information to prepare a meaningful study. Alternatives other than the two listed in the question may also be included if the investigator feels they are valid options.

Identification of *alternatives* will give the study a point of reference. In any decision there are alternatives from which the investigator may choose. Some alternatives will be a better fit for the organization than others, this is why one must take the time and effort to properly study each alternative. The status quo is always an alternative, and depending on the results of the study it may be the most desirable alternative.

The third key feature is the *time frame* the decision will hold. Time affects which costs are relevant and which are not. For example, if the change will be short-term, a staffing contract extending beyond the decision will not be relevant. On the other hand, if the decision will stand for a longer period, the staffing contract may be eliminated.

The bottom line regarding relevance is whether the cost will change depending on which alternative is selected. If so, then the cost is relevant to the decision; if not, the cost should not be included in the study.

Cost Finding

Measuring costs can be a very difficult task. The investigator must consider the various types of costs, determine which should be measured, and understand the various methods in which they can be measured. Traditional accounting measures cost based on the departmental structure of the organization

(Turney 1991). Allocations of overhead costs are frequently dispersed by labor hours or based on direct costs. These allocation methods are arbitrary and their outputs will be similar.

Cost accounting is now being used as a decision tool for management (Nemes 1990). Many managers now realize the need to more accurately determine the cost of products and services. This has caused a surge into the development of more effective means of measuring costs.

Traditional Cost Accounting Versus Activity-Based Costing

Activity Based Costing (ABC) is an internal costing system used to allocate overhead and assign costs more accurately than traditional methods (Turney 1991 and Holmes and Schroeder 1996). ABC improves operational processes by identifying and eliminating non-value added activities. This costing method assigns resource costs based on *use.* Costs are assigned to the *product* or the *consumer.* A variety of approaches and guidelines are being used by those who practice ABC's generally accepted principles and procedures. Even in the worst cases, ABC serves an integral role in process analysis and evaluation.

Traditional accounting systems within the Department of Defense capture and distribute resource costs based on organizational elements, budgetary accounting, or traditional cost accounting with direct and indirect cost allocations. ABC is a more representative distribution of resource use since the cost allocations are based on the direct *cost drivers* inherent in each of the work activities making

up the organizational structure. ABC applies resource use directly to the output products or services based on the actual work activities of the process.

ABC is an essential part of the functional process improvement and reengineering effort (Turney 1991). It serves to capture quantified cost and time data and translate it into decision information. While qualitative evaluation and determination may disclose what is "better," it is not designed to make decisions as to what is "cheaper" or "faster."

METHODOLOGY

The study's basic methodology focused on identifying and comparing CHAMPUS and MTF costs. CHAMPUS costs were found through hospital data collection systems. The mothers' inpatient and outpatient costs, and neonatal costs were extracted from MCQA and aggregated to arrive at a total cost. To find MTF costs, direct and indirect costs, and fixed and variable costs were identified. From these cost categories, relevant costs were identified. Inpatient costs were found using OB related DRGs and a weighted allocation formula. The OB costs associated with CHAMPUS were then compared with the costs incurred by the MTF for equivalent care.

Finding the Cost Object

The first step was to determine a clear definition of the cost object. In this study the cost object was the average cost of one normal vaginal delivery and its associated prenatal visits.

The second step was to determine the alternatives associated with the situation at hand. The status quo is always an option, although in many cases it is not very appealing. Its frequent lack of appeal is often related to poor outcomes which may have prompted the study to begin with. The second alternative was to close the OB service at NHCL and pay for all OB care with CHAMPUS and supplemental care funds. This option would force the hospital's outpatient OB services to be greatly reduced or possibly closed entirely. If NHCL chooses to continue serving its active duty population, a small contingent of OB providers will be necessary to handle routine outpatient visits. The third and final option is to close all outpatient services, and send all OB care to civilian providers. This assumes the community can take on the additional load.

Next, the time frame of the analysis was determined in order to identify which costs were relevant. The time frame of the analysis was particularly important given the progressing implementation of Tricare.

Cost finding began with a search for reliable data from established hospital collection and reporting systems. Data collection at NHCL is spread throughout several departments, making it more difficult than if a centralized data repository

existed. Navy Medicine uses a number of diverse, nonconnected information systems. At the local level this makes it difficult to collect data.

Finding CHAMPUS Costs

Inpatient Obstetrics Costs

CHAMPUS costs were researched through MCQA, a government-owned management information system designed to provide health care utilization reports. MCQA incorporates data from several government and civilian sources and allows the user to manipulate data in such a way that it becomes meaningful to the user.

Appendix 1 is a printout of the MCQA report used to reveal the average cost of disengaging OB patients to CHAMPUS during FY96. Inpatient International Classification of Disease (ICD-9) codes from FY96, were used to identify uncomplicated pregnancy cases. An average cost computation was then determined for each case. The MCQA system can also break down procedures, by hospital, that were paid by CHAMPUS during the specified period. This list was used to represent the patients NHCL had disengaged due to an excess in volume.

In Appendix 1, the first and second columns identify the DRG number and title abbreviations, respectively. The third column lists the number of admissions for each DRG from column 2. The fifth column is the Government Paid Institution per Admission. This is reached by dividing column 4 by column 3, to determine the average cost per admission. Column 7 provides the average professional cost

CHAMPUS pays per admission for each DRG. In column 1, below the DRGs, is a row entitled "Total." This row sums each column. To reach the total CHAMPUS cost per birth, columns 5 and 7 are summed. This is the relevant figure for this study because it reveals the amount of CHAMPUS dollars the Commanding Officer may choose to pay under Tricare.

Finally, the costs displayed in Appendix 1 include a 20% discount off the CHAMPUS maximum allowable (CMAC) for the facility's services and a 20-26% discount off the CMAC for professional fees for the first quarter of FY96. During the second quarter, only the provider discount was available. This discount has since been discontinued and subsequent costs will be higher. The only discount offered at this time is 10% on certain outpatient visits (Hillyer 1997).

Patient pays related to CHAMPUS, even though there is no direct impact on CHAMPUS costs, should at least be considered due to the increased financial burden on the patient. Patients are responsible for deductibles as well as co-pays when using CHAMPUS. Patient satisfaction will surely be affected if patients are forced to use CHAMPUS.

Outpatient Obstetrics Costs

To account for the costs of outpatient visits, refer to column 7 of Appendix 1. The professional costs of an uncomplicated delivery as well as providing prenatal care are included in this figure. When the obstetrician accepts the patient,

the professional fee includes all OB related care from the time the patient is accepted through the post partum visit.

Neonatal Costs

The steps used to determine the costs of neonatal care paid by CHAMPUS resemble those described above for finding the cost of OB care. Appendix 2, the neonatal cost report, depicts the neonatal costs incurred following the disengagement of OB patients. The general layout is the same as the description given for OB costs except the DRGs and DRG titles have changed to reflect costs of neonatal care. To arrive at the total cost CHAMPUS paid for neonatal care during FY96, columns 5 and 7 are summed. Their total is the average total cost CHAMPUS incurred for care associated with newborns.

Finding MTF Costs

Finding OB costs within the MTF required much more involvement than determining CHAMPUS costs. Reporting systems used by the hospital often included non-relevant costs, so a breakdown of costs within various data collection systems was necessary. Other situations required interviews with experts in specific areas in order to expose and trace costs.

Inpatient Costs

To determine costs associated with inpatient OB care, the Fiscal Department's Uniformed Management Report (UMR) was utilized. The UMR is a system designed to track direct costs for Department of Defense facilities. The system is managed locally by the Fiscal Department and provides cost data in a variety of formats. Costs are inputed by the Fiscal Department and a monthly report is produced. These reports are used at the departmental and directorate levels as well as for reporting costs to higher authority.

MCQA was utilized to extract specific DRG data. This data included the number of OB cases admitted to NHCL during FY96 and DRG weights for each OB related DRG. This data was used to produce a relative weighted product (RWP), which was achieved by multiplying the number of cases performed within a DRG by the appropriate DRG weight. An abbreviated description of each DRG can be found in Appendix 3.

To find the average cost of a single vaginal delivery without complications (DRG 373), the total cost is divided by the sum of the RWPs and then multiplied by the respective DRG weight (see Appendix 3).

OB / Labor and Delivery (L&D) Costs

Appendix 4 is a report from the UMR that includes inpatient OB for FY96. The fourth column from the left is the department description, in this case OB. The next column of concern is the "E" column. The letters in this column

represent the various types of direct costs addressed by this system. Table 1 lists the "E" codes and the type of cost each represents. The last column of significance in Appendix 4 is "YTD Expense," or year-to-date expense. In this column, expenses for each cost type are listed.

Table 1. UMR "E" Codes

"E" Code Description	Code
Military Labor	1
Pharmacy	4
Military Labor	6
Military Labor	C
Transportation	K
Lease	M
Maintenance and Repair	P
Supplementary Care	Q
Supplies	T
Civilian Labor	U
Equipment	W
Printing	Y

Source: UMR

Table 2 identifies the inpatient/L&D costs relevant to this study. These costs are entered into the UMR as if they were a single entity. The UMR has no way of breaking them out, making it difficult to determine what part of the total cost can be attributed to one department or the other. Nursery costs are listed separately.

Table 2. Inpatient/L&D Costs

Cost Category	Inpatient / L&D
Military Labor	$1,415,514
Civilian Labor	$909,927
Transportation	$57
Lease	$0
Maintenance & Repair	$7,122
Supplemental Services	$7,400
Materials	$156,863
Pharmacy	$315
TOTAL	**$2,497,198**

Source: UMR

Military labor contributed the largest relevant cost. This includes all non-civilian labor supporting OB/L&D care. Of all relevant costs, military labor accounted for 56%. Other relevant costs included: transportation, leases, maintenance and repair, supplemental services, materials, and pharmacy. Civilian labor made-up the next largest segment of the OB/L&D costs which accounted for 36%. The remaining 8% falls under the other 6 categories.

Nursery Costs

Nursery costs included the same cost categories as the Inpatient OB/L&D Department. In the Nursery, civilian labor was the most significant cost, accounting for 64% of total Nursery costs. Table 3 lists the cost categories for FY96 for the Nursery Department.

Table 3. Nursery Costs

Cost Category	Nursery
Military Labor	$311,408
Civilian Labor	$620,824
Transportation	$6
Lease	$0
Maintenance & Repair	$0
Supplemental Services	$0
Materials	$34,168
Pharmacy	$10
TOTAL	**$966,416**

Source; UMR

Outpatient Visit Costs

Outpatient costs in the MTF are based on professional costs, supplies and ancillary costs accrued during the prenatal period. Each outpatient visit is handled in the Obstetrics and Gynecology (OB/GYN) Department at NHCL. This clinic deals with a wide variety of patients, therefore, numerous types of visits have been established to facilitate their care. Discussion with Captain Sidney Ranck, Head, OB/GYN Department, quickly solved the problem of differentiating between visit types for costing purposes. Although visits may be categorized differently, their consumption of resources was very similar. Therefore, for the purposes of this study, the visits and costs are assumed equal. Table 4 shows the direct costs, by category, that support the OB/GYN Clinic.

Table 4. Direct Outpatient Costs

Cost Category	Outpatient
Military Labor	$529,747
Civilian Labor	$109,961
Transportation	$6
Lease	$689
Maintenance & Repair	$15,080
Supplemental Services	$48,911
Materials	$19,640
TOTAL	$724,034

Source: UMR

The MEPRS Workload Data report was utilized to determine the total number of visits the OB/GYN Clinic had in FY96. This number was divided into the total direct costs for the clinic during that period. The result was an average cost per visit of $27.

Captain Ranck also stated the average uncomplicated OB patient has 12 prenatal visits during pregnancy. This information was used to ascertain the total cost for one patient's prenatal care. The average cost per visit was then multiplied by 12. This accounts for all prenatal visits during the pregnancy.

Ancillary Costs

The MTF OB service cost analysis must also include the cost of providing ancillary services. In this case, only laboratory and pharmacy costs are included (ultrasounds are included in the outpatient visit). The OB/GYN Clinic Staff outlined the routine laboratory procedures and pharmaceuticals ordered during the prenatal period. Appendix 5 lists these items.

Generally, the only pharmaceuticals prescribed to uncomplicated OB patients are prenatal vitamins. A nine month supply is dispensed to the patient following their first provider visit. The cost of dispensing and checking the order have been calculated by the pharmacy staff. An average pay grade and time required to perform the job was also determined by the pharmacy staff. Labor was included for this evolution due to the large percentage of civilian time spent performing the labor. The labor costs were added to the cost of the materials to reach the total costs from the pharmacy.

The time laboratory technicians spent running tests was also included. The time costs were added to the cost of materials, then multiplied by the number of times the test would be performed. In most cases, tests were only requested once, but a few were repeated at 28 weeks gestation. Laboratory cost information was taken from cost studies performed by the Laboratory Department.

Batch testing is frequent and often required by the laboratory for certain tests. The purpose of batching tests is to reduce time and the cost of supplies. When indicated, batch costs were used in this study.

Other Costs

Based on consultation with OB subject matter experts, anesthesia services occasionally increase inpatient costs. No other OB related departmental costs played a significant enough role in OB care to be included in this study.

Based on 3 months of data collected in the L&D Department, approximately 25% of uncomplicated OB patients request anesthesia services. Services provided to these patients include epidural and intrathecal anesthesia. An average pay grade of O-4 was used to determine labor costs. Special and professional pays were included and an hourly rate was determined. Anesthesia personnel concluded that each patient using anesthesia services required an average of four hours of anesthesia care. On average, the cost of the materials (anesthesia kit, pharmaceuticals, and other supplies) necessary to provide the requested services was $75. To determine a per patient anesthesia cost, labor and the total costs of materials was summed then "spread" among all patients.

Total Prenatal Costs

Next, the total cost for 12 outpatient visits was added to ancillary costs to reveal the average total cost of uncomplicated prenatal care. Table 5 displays the direct outpatient OB costs.

Table 5. Total Direct Prenatal Costs

Total Number of Visits (a) =		26,784
Total Direct Costs (b) =		$724,034
Average Cost Per Visit (c) =	b / a = c	$27
Total Ancillary Costs (d) = (for uncomplicated OB)		$202
Total Prenatal Costs (e) =	(c x 12) + d = e	**$526**

Sources:
Visits - MEPRS Workload Data
Direct Costs - UMR
Ancillary - NHCL Lab Cost Analysis

Validity and Reliability

The determination of validity was based on the data utilized in this study. Computerized accounting and tracking programs developed by the Defense Department were employed to provide the data for this analysis. In some cases, breaking down grouped costs was necessary to purify data to ensure only relevant costs were included. Expert opinion was used in some areas to reveal specifics when hard data was unavailable.

Validity was also supported in the methodology used in this study. The general structure of the study was established through similar methodologies found in the literature search.

Reliability is demonstrated by the check and balance processes used by departments who manage the various data collection systems throughout NHCL. These include internal as well as external audits, Inspector General visits, Healthcare Support Office reviews, and other independent inspections performed on the accounting systems throughout the hospital.

RESULTS

This study revealed that OB costs at NHCL were considerably less than those incurred via CHAMPUS. Therefore, further analysis into the possibility of increasing the volume of OB care at NHCL is warranted.

Based on data from MCQA, the average CHAMPUS cost for an uncomplicated vaginal delivery and prenatal care was $5,549 in FY96. This

includes Institution Costs of $1,762, Professional Costs of $1,206, Neonatal Institution Costs of $2,088, and Neonatal Professional Costs of $493.

Total direct OB costs for NHCL averaged $3,220 in FY96. Included in this figure are Inpatient Costs of $2,611, Outpatient Costs of $526, and Anesthesia Costs of $83.

It is clearly more cost effective to provide uncomplicated OB care via the MTF at the current volume. The average savings per patient at the current volume, if care is rendered at NHCL, is $2,329. As long as only marginal costs are affected, NHCL should continue to see as many uncomplicated OB patients as possible.

DISCUSSION

Direct costs can be valuable when comparing the cost of two similar items or product lines, such as MTF costs versus CHAMPUS costs. Direct costs include only those costs that are directly associated with a specific department. Using full MTF costs would not be as accurate because too many irrelevant costs, such as certain stepped down costs, would be included. These costs would not be affected if the MTF reduced its current level of care in a given area. Therefore, full costs would not be useful in comparing NHCL OB care to the costs incurred when care is provided by civilian providers and paid for via CHAMPUS.

It was necessary to make a couple of assumptions during the course of this financial analysis. The first was that the data provided from MCQA, the UMR and

other data sources were accurate. The second assumption was that expert opinion used in this study was also accurate.

A limitation to this study was the inclusion of military labor in determining the costs of OB care at the MTF. Excluding these costs would drastically decrease the overall cost of OB care at NHCL. But, at the same time it would not accurately compare MTF costs to CHAMPUS costs. The decision to include military labor was based on the need to compare figures that included like costs. The drawback, or limitation, to including the military labor costs was that any military time devoted to readiness or other duties was also included.

CONCLUSIONS AND RECOMMENDATIONS

At this point, the cost of providing uncomplicated OB care at NHCL, and the cost of providing the same care through CHAMPUS have been determined. At the current volume, NHCL reduces OB costs by $2,329 each time an OB patient is kept in the MTF. What is not known is the additional cost associated with significantly increasing OB care at NHCL. Using the average cost of a single patient to ascertain the cost of caring for an increased number of patients will not provide an accurate figure. A step-fixed cost is one way to determine the cost of care at various patient volumes. Future analysis should evaluate any additional fixed costs incurred when patient volume exceeds 100 deliveries per month.

The importance of "make versus buy" analyses cannot be over stated. These analyses will continue to be an avenue for determining how health care

organizations will do business in the future. Organizations must continue to analyze their product lines and determine how to improve resource utilization. With the military drawing-down, the military health service system must also shrink proportionately. Personnel and all other resources will be decreased in an attempt to reduce government spending.

Under Tricare, MTFs will receive a capitated budget, forcing them to find ways to provide care in the most efficient and effective manner possible. The "make versus buy" analysis is one such tool that will help MTF Commanders determine where to get the most "bang for their buck."

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OB Camp Lejeune (CHAMPUS) FY96

Inpatient DRG	Description	Admissions	Gov't pd Institution	Gov't pd/ Adm	Gov't pd Prof	Gov't $ Prof/ Adm
370	C-Section w/Complications	23	71,419.00	3,105.17	51,908.00	2,256.87
371	C-Section w/o Complications	104	194,147.00	1,866.80	211,317.00	2,031.89
372	Vag. Del. w/ Comp.	92	116,300.00	1,264.13	156,019.00	1,695.86
373	Vag. Del. w/o Comp.	436	393,111.00	901.63	721,381.00	1,654.54
374	Vag. Del. w/Steril. and/or D&C	39	62,150.00	1,593.59	82,210.00	2,107.95
375	Vag. Del. w/ OR Proc. (excpt. Steril.)	0	0	0	0	0
TOTAL		694	$837,127.00	$ 1,206.23	$1,222,835.00	$ 1,762.01

	1,206.23
	1,762.01
Gov't cost per birth is:	$ 2,968.24

Appendix 1

- First quarter of FY96 included a 20% discount from Onslow Hospital and a 20-26% provider discount.
- Second quarter of FY96 included a 20-26% provider discount.

Source: Managed Care Query Access (MCQA) System

Newborns Camp Lejeune (CHAMPUS) FY96

Inpatient DRG	Description	Admissions	Gov't pd Institution	Gov't pd/ Adm	Gov't pd Prof	Gov't $ Prof/ Adm
V3	Non-DRG Liveborn Infant	403	434256	1078	110618	274
76	Non-DRG Cond in Perinat Pr	10	16107	1611	2665	267
391	Normal newborn	491	127737	260	100278	204
600	Neonate, Died within 1 Day	2	3150	1575	0	0
602	Neonate, BWT 750G, Disch Al	1	84453	84453	17483	17483
604	Neonate, BWT 750-999G, Disch	10	588208	58821	91611	9161
605	Neonate, BWT 750-999G, Died	1	33942	33942	4343	4343
607	Neonate, BWT 1000-1499, W/O	10	253431	25343	32404	3240
610	Neonate, BWT 1500-1999, WIT	1	2474	2474	165	165
611	Neonate, BWT 1500-1999, W/O	7	126223	18032	16071	2296
612	Neonate, BWT 1500-1999, W/O	7	91836	13119	16707	2387
613	Neonate, BWT 1500-1999, W/O	2	16270	8135	3004	1502
614	Neonate, BWT 1500-1999, W/O	3	11873	3958	1960	653
617	Neonate, BWT 2000-2499, W/O	1	13589	13589	1978	1978
618	Neonate, BWT 2000-2499, W/O	3	22118	7373	8465	2822
619	Neonate, BWT 2000-2499, W/O	6	35375	5896	5627	938
621	Neonate, BWT 2000-2499, W/O	9	12253	1361	2308	256
622	Neonate, BWT >2499, W/ SI	3	92976	30992	19959	6653
626	Neonate, BWT >2499, W/ SIG	15	222662	14844	64302	4287
627	Neonate, BWT >2499, W/O SIG	16	55799	3487	10857	679
628	Neonate, BWT >2499, W/O SIG	23	37279	1621	11572	503
630	Neonate, BWT >2499, W/O SIG	91	46124	507	26792	294
		1115	$ 2,328,135	$ 2,088	$ 549,169	$ 493

	$	2,088
	$	493
Gov't cost per birth is:	$	2,581

Source: Managed Care Query Access (MCQA) System

Appendix 2

FY96 Inpatient OB Costs

Direct Costs = $3,463,614

DRG	Description	# Cases	DRG Wt.	RWP
370	C-Section w/Complications	51	0.9914	50.5614
371	C-Section w/o Complications	113	0.795	89.835
372	Vag. Del. w/ Comp.	94	0.5182	48.7108
373	Vag. Del. w/o Comp.	787	0.3871	304.6477
374	Vag. Del. w/Steril. and/or D&C	27	0.6798	18.3546
375	Vag. Del. w/ OR Proc. (excpt. Steril.)	2	0.6817	1.3634
	SUM =	1074	**SUM =**	513.4729

Average Cost Per DRG for FY96

DRG	Direct Cost
370	$ 6,687
371	$ 5,363
372	$ 3,496
373	**$ 2,611**
374	$ 4,587
375	$ 4,598

Direct Costs Sum RWP	X	DRG Wt. =	Average Cost for DRG 373
$3,463,614			
513.4729	X	0.3871 =	$ 2,611

Source: MCQA

SG	FC	CAC	DESCRIPTION	TOTAL CNSIGNMENTS	E E	YTD ACT MAN HRS	-- WORK UNITS -- PLANNED	YTD	ACT	UNIT COST	PLANNED ANNUAL EXP	YTD EXPENSE	PRIOR YR UNDELIVERED EXPENSE	ORDERS	GROSS ADJUST OBLIGATIONS
M9	YP	4ACB	OBSTETRICS		Q							18598	9294	66351	75654
M9	YP	4ACB	COST ACCT TOTAL									18598	9294	66351	75654
M9	YP		F/SF BY EE		Q							18598	9294	66351	75654
M9	YP		F/SFC TOTAL									18598	9294	66351	75654
M9	YU	4ACA	GYNECOLOGY		C	76						3152			
M9	YU	4ACA	GYNECOLOGY		T							708	434		273
M9	YU	4ACA	GYNECOLOGY		U	16						395			395
M9	YU	4ACA	GYNECOLOGY		W							134			134
M9	YU	4ACA	GYNECOLOGY		1	7294						173493			
M9	YU	4ACA	COST ACCT TOTAL			7386	754	742	1.08			177882	434		802
M9	YU	4ACB	OBSTETRICS		C	266						20084			
M9	YU	4ACB	OBSTETRICS		J							25			25
M9	YU	4ACB	OBSTETRICS		K							32	6-		38
M9	YU	4ACB	OBSTETRICS		P							7122	1438	693	6377
M9	YU	4ACB	OBSTETRICS		Q							7400	2654	3228	7974
M9	YU	4ACB	OBSTETRICS		T							156863	603	4295	160555
M9	YU	4ACB	OBSTETRICS		U	42029						909927	19867-	16301	946095
M9	YU	4ACB	OBSTETRICS		W							12492	8812	44021	47701
M9	YU	4ACB	OBSTETRICS		Y							1541	434		1108
M9	YU	4ACB	OBSTETRICS		1	62589						1394221			
M9	YU	4ACB	OBSTETRICS		4							315			315
M9	YU	4ACB	OBSTETRICS		6	56						1209			
M9	YU	4ACB	COST ACCT TOTAL			104940	3506	3357	348.58		988600	2511232	5932-	68538	1170187
M9	YU	4AXO	MILITARY DUTY &		1	9651						211672			
M9	YU	4AXO	COST ACCT TOTAL			9651						211672			
M9	YU	4AZO	ALLOCATED COST		Z							152256-	2293		154550-
M9	YU	4AZO	COST ACCT TOTAL									152256-	2293		154550-
M9	YU		F/SF BY EE		C	342						23236			
M9	YU				J							25			25
M9	YU				K							32	6-		38

Source: UMR

SG FC CAC DESCRIPTION	TOTAL CNSIGNMENTS	E E	YTD ACT -- WORK UNITS -- MAN HRS	PLANNED	YTD ACT	UNIT COST	PLANNED ANNUAL EXP	YTD EXPENSE	PRIOR YR EXPENSE	UNDELIVERED ORDERS	GROSS OBLIGATIONS
M9 YU 4ADA PEDIATRICS		T						351			351
M9 YU 4ADA PEDIATRICS		U	14					351			351
M9 YU 4ADA PEDIATRICS		W						6030	6030		
M9 YU 4ADA PEDIATRICS		1	16018					310890			
M9 YU 4ADA COST ACCT TOTAL			16111	1821	1443	.49		320745	6030		702
M9 YU 4ADB NURSERY		C	100					3434			
M9 YU 4ADB NURSERY		K						6			6
M9 YU 4ADB NURSERY		T						34168	869	546	33844
M9 YU 4ADB NURSERY		U	26322					620824	300	10328	630852
M9 YU 4ADB NURSERY		W						25946	25946	35451	35451
M9 YU 4ADB NURSERY		1	16680					304154			
M9 YU 4ADB NURSERY		4						10			10
M9 YU 4ADB NURSERY		6	49					3820			
M9 YU 4ADB COST ACCT TOTAL			43151	2751	2727	256.75	731100	992362	27115	46324	70016
M9 YU 4AEA ORTHOPEDICS		C	139					2377			
M9 YU 4AEA ORTHOPEDICS		T						69			6
M9 YU 4AEA ORTHOPEDICS		U									
M9 YU 4AEA ORTHOPEDICS		1	13597					291068			
M9 YU 4AEA ORTHOPEDICS		6	25					890			
M9 YU 4AEA COST ACCT TOTAL			13761	2173	1948	.04		294403			6
M9 YU 4AEB PODIATRY		T						60			6
M9 YU 4AEB PODIATRY		U									
M9 YU 4AEB PODIATRY		1	1106					28035			
M9 YU 4AEB COST ACCT TOTAL			1106	164	204	.30		28095			6
M9 YU 4AFA PSYCHIATRIC CAR		C	32					3216			
M9 YU 4AFA PSYCHIATRIC CAR		T						4117		91	42
M9 YU 4AFA PSYCHIATRIC CAR		U	10245					235930	75-	525	2365
M9 YU 4AFA PSYCHIATRIC CAR		W						637	637	5570	55
M9 YU 4AFA PSYCHIATRIC CAR		Y						74	6		6
M9 YU 4AFA PSYCHIATRIC CAR		1	25598					516931			
M9 YU 4AFA PSYCHIATRIC CAR		6	16					366			
M9 YU 4AFA COST ACCT TOTAL			35891	2805	3530	69.79	171000	761271	568	6186	2463

SG FC CAC	DESCRIPTION	TOTAL CNSIGNMENTS	E	YTD ACT -- WORK MAN HRS	UNITS -- PLANNED YTD	UNITS -- ACT	UNIT COST	PLANNED ANNUAL EXP	YTD EXPENSE	PRIOR YR EXPENSE	UNDELIVERED ORDERS	GROSS ADJUST OBLIGATIONS
M9 YP 4BCC	OBSTETRICS CLIN		@						87	87		
M9 YP 4BCC	COST ACCT TOTAL								87	87		
M9 YP	F/SF BY EE		@						87	87		
M9 YP	F/SFC TOTAL								87	87		
M9 YV 4BCB	GYNECOLOGY CLIN		C	3					144			
M9 YV 4BCB	GYNECOLOGY CLIN		M						777	88		68
M9 YV 4BCB	GYNECOLOGY CLIN		@						1427		2045	347
M9 YV 4BCB	GYNECOLOGY CLIN		T						23409	229	2095	2527
M9 YV 4BCB	GYNECOLOGY CLIN		U	5522					113843		225	11406
M9 YV 4BCB	GYNECOLOGY CLIN		W						9488	9488	1485	148
M9 YV 4BCB	GYNECOLOGY CLIN		Y						412	43		37
M9 YV 4BCB	GYNECOLOGY CLIN		1	4806					103534			
M9 YV 4BCB	GYNECOLOGY CLIN		4						6			
M9 YV 4BCB	GYNECOLOGY CLIN		6	24					533			
M9 YV 4BCB	COST ACCT TOTAL			10355	6203	5988	24.28	167900	253573	9847	5850	14536
M9 YV 4BCC	OBSTETRICS CLIN		C	262					13578			
M9 YV 4BCC	OBSTETRICS CLIN		K						6			
M9 YV 4BCC	OBSTETRICS CLIN		M						777	88		68
M9 YV 4BCC	OBSTETRICS CLIN		P						13409	2099	3770	1508
M9 YV 4BCC	OBSTETRICS CLIN		@						39027	4105	13988	4891
M9 YV 4BCC	OBSTETRICS CLIN		T						19807	167		1964
M9 YV 4BCC	OBSTETRICS CLIN		U	6249					109886		75	10996
M9 YV 4BCC	OBSTETRICS CLIN		W						3626	3271		35
M9 YV 4BCC	OBSTETRICS CLIN		Y						2104	277		182
M9 YV 4BCC	OBSTETRICS CLIN		1	25127					516169			
M9 YV 4BCC	COST ACCT TOTAL			31638	26595	27825	7.06	230300	718388	10007	17833	19646
M9 YV 4BXO	MILITARY DUTY &		1	12090					370777			
M9 YV 4BXO	COST ACCT TOTAL			12090					370777			
M9 YV	F/SF BY EE		C	265					13722			
M9 YV			K						6			
M9 YV			M						1554	176		137
M9 YV			P						13409	2099	3770	1508

FY96 Direct Outpatient OB Costs

Ancillary Costs

Pharmacy

Labor			
	Grade	Time (min)	Cost Attrib. to OB
Dispensing	E-4	2	$0.49
Checking	GS-11	1	$0.47

Pharmaceutical Costs = $9.15

Total Pharmacy Costs = $10.10

Laboratory

Test	Time (min)	Supply Cost	Total Cost
*HCG	30	$4.39	$26.43
*HCT	1	$0.26	$1.11
*PLT	5	$0.88	$4.70
*ABO/Rh	5	$0.92	$4.78
*Antibody	15	$0.29	$9.41
*1 Glucola	15	$1.37	$11.57
RPR	45	$0.69	$13.93
HIV	30	$5.33	$14.16
HBSAg	30	$3.55	$12.38
Sickledex	45	$0.21	$13.45
UA	10	$6.84	$9.78
Urine C&S	15	$0.97	$5.38
GC	15	$1.52	$5.93
Chlam	75	$5.90	$27.96
Ruebella	60	$3.53	$21.18
PAP	24	$0.49	$7.55
PPD	6	$0.01	$1.78

Average paygrade of E-5 was used for all tests
* = also tested at 28 wks.

Total Lab Costs for OB Patient = $191.46

Total Ancillary Costs for Uncomplicated OB = $202

Source: NHCL Laboratory Cost Analysis

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13. ABSTRACT *(Maximum 200 words)*

Naval Hospital Camp Lejeune (NHCL), like other health care facilities throughout the world, must find ways to reduce the costs of providing health care, improve the quality of care, and increase access to its beneficiaries. If cost, quality and access are not improved the facility will ultimately be replaced by a more efficient and effective means of providing health care to its beneficiaries.

Historically, the local community hospital, Onslow Memorial Hospital (OMH), offered substantial discounts to patients eligible for the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). These discounts have since diminished and costs have subsequently increased. To combat the ever increasing costs associated with health care, NHCL has begun to analyze costs and find ways to increase efficiency and effectiveness.

In 1996, NHCL's Obstetrics costs accounted for nearly 25% of their total CHAMPUS bill. This prompted a cost study to determine NHCL's cost of providing OB care as compared to the costs of providing equivalent care to beneficiaries through the CHAMPUS system. This study revealed that OB costs at NHCL were considerably less than those incurred via CHAMPUS. Therefore, further investigation into increasing OB volume at NHCL is warranted.

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